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Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:
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Empfohlene Zitierung / Suggested Citation:

Schneider, N. F., Bujard, M., Wolf, C., Gummer, T., Hank, K., & Neyer, F. J. (2021). Family Research and Demographic Analysis (FReDA): Evolution, Framework, Objectives, and Design of "The German Family Demography Panel Study". *Comparative Population Studies - Zeitschrift für Bevölkerungswissenschaft*, 46, 149-186. <https://doi.org/10.12765/CPoS-2021-06>

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Family Research and Demographic Analysis (FReDA): Evolution, Framework, Objectives, and Design of “The German Family Demography Panel Study”

Norbert F. Schneider, Martin Bujard, Christof Wolf, Tobias Gummer, Karsten Hank, Franz J. Neyer

Abstract: This article introduces the evolution, framework, objectives, and design of the new data infrastructure “FReDA – The German Family Demography Panel Study”, which has been funded by the German Federal Ministry of Education and Research (BMBF) since 2020. FReDA is rooted in the Generation and Gender Survey (GGS) and the German Family Panel (pairfam). FReDA was initiated to facilitate research on family and demography by providing a comprehensive panel study allowing for international comparisons as well as dyadic analyses through a multi-actor design. The survey covers major fields of family research, such as fertility behaviour, reproductive health, work-family conflict, dyadic division of work, gender roles, intimate relations, separation and divorce, parenting and intergenerational relations, social inequalities, family attitudes, and well-being. FReDA interviews are conducted in a self-administered web-based (CAWI) or paper-based (PAPI) manner. The infrastructure consists of two different samples. First, the new FReDA-GGS survey started in early 2021, with a wave 1 study population of individuals aged 18 to 49 years and their partners. Second, the FReDA-pairfam survey will continue the 14-wave pairfam sample from 2022 onwards. The questionnaires of both samples will be harmonised as FReDA evolves. Data accessibility, organisation, and future perspectives of the data infrastructure are described and discussed in the paper’s conclusions.

Keywords: Family research · Social demography · Dyadic multi-actor design · GGS · pairfam · Panel survey · Data infrastructure

1 Introduction – Why is FReDA necessary?

In highly developed countries, fundamental changes for families and their surrounding conditions are challenging family researchers and demographers (*Chambers 2012; Esping-Andersen 2009; Goldscheider et al. 2015; Schneider/Kreyenfeld 2021; Seltzer et al. 2005*). Although the majority of babies are still more likely to be born to a mother-father married couple than to any other family type (*Smock/Greenland 2010: 576*), families in Europe and worldwide are increasingly heterogeneous and have become a more complex phenomenon for at least nine related reasons:

- (1) Individualisation processes have led to a growing diversity of intimate relationships and a deinstitutionalisation of partnership relations (*Chambers 2012; Schneider 2012*). Family forms such as non-married families, single-parent families, patchwork families, same-sex families, and living apart together (LAT) are increasing in almost all European countries.
- (2) In addition, processes of family development are increasingly diverse. Concepts of family development and the life cycle (*Martin 2018*) have become less applicable since intimate relationships, career entry, living together, marriage, and having children are optional, fluid, and occur in diverse sequences; thus family behaviour and dynamics are changing. Contemporary family dynamics are characterised by decreasing institutionalisation, a high diversity between social groups, and possibly processes of re-standardisation.
- (3) The emergence of medically assisted reproduction (MAR) technology has made the fertility process more diverse (*Passet-Wittig/Bujard 2021*), allowing new variants for third-party parenthood and a slightly longer “window of opportunity” for having children (*Habbema et al. 2015*).
- (4) The gender revolution (*Goldscheider et al. 2015*) has fundamentally changed women’s and (to a lesser degree; *England 2010*) men’s life courses as well as the way couples organise their careers, housework, care, and parenting. In some European countries, family policy has reacted to these changes with a paradigm shift from familism to defamilism (*Esping-Andersen 2009*). The concept of “defamilism” means that in welfare states, the state and the market are increasingly performing tasks that were previously the family’s responsibility.
- (5) Thereby, the relationship between family and society has changed, since the state now takes responsibility for care, in order to allow for the shift from the family as an institution to more individualistic patterns with greater gender equity. Concerns about low and lowest low fertility in Europe (*Kohler et al. 2002*) and the perception of policy options to reconcile work and family (*McDonald 2002*) have increased the visibility of family policy. In Germany and several other European countries, there was a paradigm shift with new parental leave policies and a threefold increase in childcare slots since the early 2000s.
- (6) Digitalisation has changed family and private lives in several ways, including family communication, the emergence of online dating, options for working from home, and time spent with children (*Danielsbacka et al. 2020*).
- (7) The spread of new normative patterns regarding education and parenthood have led to a significant change in parent-child relationships and to the

emancipation of children. This has accelerated the transition to families with fewer children. Heightened expectations of successful parenting and "good" parents have made the transition to parenthood more pre-suppositional and the consequences of parenting more palpable for parents (*Merkle/Wippermann* 2008).

- (8) The family remains the most important institution for primary socialisation (e.g. *Grundmann* 2021). Everyday social practice in the family is highly different compared to social and peer groups. Thereby, its societal importance and function varies over time, between societal groups and between cultures. The processes of socialisation are primarily influenced by changes in children's and parents' everyday lives, changes in intergenerational relationships, and changes in the interfaces between the family and other social institutions, namely school, childcare, and the labour market.
- (9) In particular, due to the limitations of the official statistics, FReDA aims to improve empirical knowledge on multi-local families. Multi-locality is a phenomenon of increasing importance for family life as a consequence of increased geographical mobility, divorce and closer intergenerational ties (as previously pursued by the pairfam project, *Huinink et al.* 2011: 78).

For cutting-edge research on these challenges, appropriate data is key. Despite considerable progress in family and demographic research, the gap between data needs and existing data has increased over recent decades. This is especially true for Germany. At the same time, there has been substantial progress in the area of data collection, with novel possibilities due to digitalisation and advances in survey infrastructures. However, these general infrastructures were only used for other topics, further increasing the gap between existing and potential data for family research. The hitherto existing data infrastructures for family and demography on younger generations are highly fragmented in Germany, but also in Europe. The Generation and Gender Survey (GGS) is a well-established survey programme for family and demographic research that has been conducted in 19 countries (*Gauthier et al.* 2018; *Vikat et al.* 2007), providing representative data after weighting (*Fokkema et al.* 2016). However, the three-year distance between panel waves is a problem for panel analyses and leads to a high attrition of respondents. Therefore, only five of the original 19 countries (until 2019) conducted more than two GGS waves. Data for a second wave are currently available for 14 countries (www.ggp-i.org). Another problem of the Generation and Gender Programme was that some countries used questionnaires not completely comparable with the general template due to country-specific interests and circumstances. The German Family Panel pairfam (Panel Analysis of Intimate Relationships and Family Dynamics) is a long-running annual panel study on partnership and family dynamics which follows a multi-actor design (*Huinink et al.* 2011). Despite the advantages of cohort designs for specific research questions, its focus on four birth cohorts (1971-73, 1981-83, 1991-93, and 2001-03) limits its representation of the general population and comparability with other studies. Furthermore, substantively more focussed datasets, such as AiD:A (*Walper et al.* 2015) or "Familienleitbilder" (*Diabaté et al.* 2019; *Schneider et al.* 2015), also offer relevant content for family research. However, they only have two or three waves, a lower number of respondents, and are only internationally comparable to a certain degree.

The fragmentation in family and demographic research becomes apparent when contrasted to data infrastructures for other research areas and age groups. The German Socio-Economic Panel study (SOEP) (Goebel *et al.* 2019) and the National Educational Panel Study (NEPS) (Blossfeld *et al.* 2011) are examples of large-scale long-term annual surveys covering research areas such as income, wealth, and the labour market (SOEP) and education (NEPS). The Survey of Health, Ageing and Retirement in Europe (SHARE) has the advantage of strict international comparability and currently consists of seven waves for the areas health, socio-economic status, and family networks, but is focussed on the age group 50 and older (Börsch-Supan *et al.* 2005).

At present, the GGP – and the GGS as its core content – is readjusting its procedures and restarting data collection efforts. These readjustments comprise the organisation and governance of the GGP, the survey modes, as well as a broadly renewed GGS questionnaire (Gauthier *et al.* 2020) and a new data collecting strategy in the participating countries. With the end of the long-term funding of pairfam by the German Research Foundation (DFG) in 2022, the need and the possibility for starting a new family panel in Germany has arisen. The basis of the panel is a questionnaire that is comparable with other countries as a GGS and also opens up the chance to continue pairfam as a long-term study.

Building on the experiences gained in the international GGS and in pairfam, the project “Family Research and Demographic Analysis” (FReDA) aims to solve the data fragmentation problem by integrating the new German GGS sample (FReDA-GGS), which is comparable with several European countries, and the pairfam sample (FReDA-pairfam), with its rich body of longitudinal information from up to 14 previous waves of data collection. We thereby create a novel family-demographic panel covering the complete family development process for the ages 18-49, including partnership, fertility, parenting, and divorce, as well as contexts such as the labour market, mobility, health, and social networks. FReDA thus combines the advantages of a representative, large-scale long-term annual survey with an international comparison. A major characteristic of FReDA is the consistent implementation of a multi-actor design by interviewing as many partners as possible for all anchor persons. In the initial phase, the project will not collect information from other actors in the family, such as children or grandparents. “Multi-actor” here means a dyadic multi-actor design. The selection of the contents of the measuring instruments is guided by the requirements of the life course paradigm (see below). In order to adequately collect life course data, the questionnaire combines well-established and innovative user-driven instruments and follows an interdisciplinary strategy by including content from sociology, demography, psychology, and economics, as well as elements from education and health. Whereas FReDA-pairfam continues a successful long-run panel study, FReDA-GGS provides the opportunity of starting a fresh panel, allowing for the use of innovative survey design and data management methods. Therefore, additional key features of FReDA are the use of mixed CAWI/PAPI self-administered questionnaires, bi-annual data collection, and to the collection of geo-referenced data. This reference paper introduces the development, scope, and design of FReDA, including challenges of family and

social demography research and key features (Section 2), the questionnaire and core research fields (Section 3), survey design (Section 4), data accessibility and the project's organisational structure (Section 5), and concludes by providing some further perspectives (Section 6).

2 Challenges of family and demographic research and key features of FReDA

2.1 Objectives

The main objective of FReDA is to cover the family development processes and the interaction of different life spheres such as partnership, parenting, gainful employment, and leisure activities during the life course in the ages from 18 to 49. FReDA aims to capture the current situation of family life and the above-mentioned changes for families and their surrounding conditions in depth – including family forms, family dynamics and behaviour, fertility, parenting, socialisation, separation and divorce, decision-making processes, changes in attitudes and gender norms, effects of policy, and digitalisation.

The process of family development is embedded in the life course, both of which are complex and dynamic processes. Therefore, a dynamic concept for explaining individual behaviour and decision-making during the life course is required as a basis for the construction of the survey instruments and for their openness. The aim of explaining family development in the life course is a demanding task not only for theory but also for data and methods, requiring the examination of individuals and family members for a longer period. Longitudinal and biographical data that are appropriate for event history models and for sequence analyses are needed for the study of family trajectories, their timing and sequence, and patterns of family development.

Furthermore, FReDA is intended to enable comprehensive analyses of the mechanism of family behaviour in a multi-actor perspective. Causes of outcomes of family dynamics, intergenerational bonds, life satisfaction, and family well-being are often the results of correlated individual and dyadic actions. This ideally requires data on all family members, such as partners, children, and grandparents. FReDA starts by systematically gathering information stemming from both partners independently.

The functioning of a family, the subjective well-being of family members, and the processes of family development are strongly influenced by the societal role of the family as a social institution. In particular, the interrelationships of family and surrounding social institutions (childcare, education, work, and others) are of great importance here. FReDA has set itself the goal of collecting data on the changes in these interrelations in order to better understand family life and family development.

Finally, as a family-demographic infrastructure, FReDA pursues the goal of generating internationally comparable data which are equally suitable for improving theoretical and empirical scientific research, social reporting, and policy advice.

2.2 Life course perspective and panel data

FReDA is guided by the life course paradigm, in which life spheres are seen as interwoven. Changes in one sphere are embedded in, and have consequences for, the others (*Elder 1994*). In the context of family, the life courses of family members are also linked with each other. Therefore, the linked life paradigm also guides FReDA.

In a recent work, *Bernardi et al. (2019)* presented a further developed concept of life course as a complex set of interdependencies, which we use as the theoretical basis for FReDA. They name three main interdependencies (or “first order interdependencies”: *ibid*: 3): the life history-related interdependence, the interdependence of life domains, and those across levels. The multilevel interdependence “connects individual action and behaviour over the life course with the life course of other people, social networks, and the ‘external’ societal opportunity structure” (*ibid*: 2). Consequently, the life course can be seen as a “steady flow of an individual’s actions and experiences, which modify domain-specific biographical states and affect individual well-being over time” (*ibid*: 7). From this perspective the creation of a systematic connection between the life course paradigm, action theory, and event-related data is essential. Another vital need is providing data that are appropriate for both theory testing and theory development, and that meet the high methodological requirements life course research presupposes. Both are main concerns of FReDA.

In this sense, FReDA follows a universal panel structure with annual interviews, wherein a specific set of questions will be asked every year in the same way. Some questions are even asked twice a year. This frequency, which is higher than the three-year rhythm of GGS and partially higher than pairfam and SOEP, allows for identifying turning points or disruptions in trajectories due to decisions, partner behaviour, and external shocks (*Bernardi et al. 2019*). Furthermore, the first wave of FReDA-GGS features a comprehensive set of biographical questions in order to capture central life course events occurring before the panel’s timeframe.

2.3 Individual and dyadic decision-making

Decision-making processes in families and relationships are often dyadic. Therefore, individual-level approaches and analyses typically are not sufficient. At least two actors are involved in most family decisions, and outcomes are often the result of longer-term bargaining processes and compromises. Dyadic negotiations and decision-making processes are integral parts of the life course paradigm, as the concept of linked lives shows (*Elder 1994*). This is also reflected in psychological theories on fertility behaviour (*Ajzen/Klobas 2013; Miller et al. 2004*), sociological approaches (*Brehm/Schneider 2019*), as well as economic bargaining approaches (*Beblo 2001*). The life course domains for children, work, and mobility have to be harmonised within couples to some degree. Despite recent advances using pairfam data (*Bauer/Kneip 2014; Hudde/Engelhardt 2020; Johnson et al. 2019; Stein/Willen 2018*), there is a clear research gap for dyadic analyses in family science and

demography, as these theoretical approaches are less often analysed. This is due to the lack of dyadic data, since many data infrastructures and panels only collect individual data.

FReDA follows a multi-actor design to reduce this lack of information and collects data regarding the respondent's partner every year. One challenge of dyadic data is that anchors have different partnerships throughout the life course and the few data sets that do include partners only consider the current partner. This does not allow for analysing the consequences of separation for *both* partners. Therefore, FReDA also collects partner data in cases of separation for at least one additional wave, and aims to integrate new partners into the yearly surveys.

2.4 Culture and structure: international comparison

Structural factors play a key role in rational choice approaches in family science, such as the economic theory of the family (*Becker* 1981) or rational choice approaches in Sociology, which challenge utility maximisation and highlight satisfaction, information, and frames (*Esser* 2004; *Lindenberg* 1985). In contrast, cultural approaches highlight roles, different family-specific norms; (*Schneider et al.* 2015; for norms on being a "family" see *Lück/Ruckdeschel* 2018), and attitudes, such as the ideal number of children (*Testa* 2012). Cultural approaches and rational choice approaches should be further integrated – following *Boudon* (2003: 17), "beliefs, actions, and attitudes should be treated as rational". Analyses of culture and structure benefit from combining the micro and macro levels. Macro level factors such as institutions, policies, the socio-structural composition of the population, economic change, and cultural change can influence individual and dyadic behaviours of families, and vice versa. The mechanisms and interdependencies of the macro-micro-macro-link (*Coleman* 1990) are decisive in understanding the dynamic changes of families and societies. However, macro and micro approaches for studying families are often disparate, leading to a fragmentation of research. However, the life course paradigm uses a multi-level structure by highlighting the institutionalisation of the life course (*Kohli* 2007) and specifying the connection of multilevel structure with time-related interdependencies and multiple domains (*Bernardi et al.* 2019).

Cultural, social, political, and economic conditions influence one's possible scope and course of action at different levels: At the macro level, for example, through demographic structure, regional contexts, economic framework conditions, infrastructure, and socio-political provisions. At the meso level, features of the social context such as social networks and institutional embedding in the labour market are significant. Finally, at the micro level, individual features of the household, partnerships, and family development are at play. These include biographical experiences and psychological dispositions of the individual, as well as individual and family resources such as time, money, education, social skills, and health (*Huinink/Feldhaus* 2008: 26f.).

FReDA collects data for economic as well as structural and cultural factors. In order to analyse both micro and macro patterns, the international comparison

is decisive. National panel data allow for case studies with individual-level data. However, the results of case studies for several research questions are fragmented, since they depend on the specific context of a country's institutional setting (*Aisenbrey/Fasang* 2017). Case studies of two or three countries are complex when aiming for a comparison using different data sets. Even then, conclusions on the influence of macro factors such as policy effects on behaviour are limited. Analyses of macro level data as conducted by OECD (*Thévenon/Luci* 2012) allow for comparing policies and institutions of twenty or thirty countries, but provide no information regarding the mechanism and processes of the individuals or dyads. Internationally comparable micro level panel data facilitates the analysis of transitions and trajectories in life course, as well as comparisons against the background of different institutional country-specific contexts by applying systematic micro-macro links. However, such data are rare in family science, with the exception of the GGS round starting in the 2000s (*Vikat et al.* 2007). FReDA has the advantage of being part of the internationally coordinated GGS surveys with the renewed GGS questionnaire (*Gauthier et al.* 2020), allowing for analyses of Germany to be compared to the cultural, institutional, and economic background of other European countries and for analyses of family diversity and of convergence or divergence in family changes across Europe (*Schneider* 2012).

2.5 Combining survey data with regional data by geo-referencing

Cultural and structural factors not only differ between countries, but also within them. The cultural heritage of regions is longstanding (e.g. *Klüsener/Goldstein* 2016), especially regarding Catholicism and Protestantism as well as the differences between former East and West German states (*Schneider et al.* 2012). In addition, structural regional opportunities such as labour markets, GDP, infrastructure, and housing strongly vary and are associated with different living conditions and fertility levels, to name only two consequences (*Bujard/Scheller* 2017). Furthermore, the regional composition of the population regarding age, education, ethnicity (*Hank/Huinink* 2015), and childcare coverage strongly vary on the district level and contribute to different labour force participation (*Zoch/Hondralis* 2017) and attitudes towards childcare for toddlers (*Zoch/Schober* 2018). FReDA will enable combining its survey data with contextual information for ecological analyses on different levels of aggregation and administrative units (for pairfam, see *Schmiedeberg* 2015). FReDA will collaborate with the Federal Agency for Cartography and Geodesy (BKG) for geo-referencing.

2.6 Enhancing multidisciplinary research: Family Science and Social Demography

Research on the family is generally fragmented across many disciplines; academic journals and concepts are related to family sociology, family demography, family economy, and so on, but the term “family science” – which we prefer in terms of multidisciplinary – is rarely used. Sociology and demography are often closely

related, a large proportion of publications in demographic journals come from sociologists, so this combined approach can be labelled “social demography” (*Hank/Kreyenfeld 2015*). However, many psychological concepts are highly relevant for family science but are only occasionally used in demography or in family research. A few psychological concepts, such as the theory of planned behaviour (TPB) (*Ajzen 1991*) or the Traits-Desire-Intension-theory (*Miller et al. 2004*), are used more frequently in demography. The TPB is and will remain a core theoretical foundation of the GGS. Some family researchers use measurements such as life satisfaction (*Pavot/Diener 2008*) or simplified indicators of the Big Five personality traits (OCEAN-model); both of which are elements of pairfam, which seek to combine sociological and psychological research. In the longer term, family research should also aim to integrate epidemio-, bio-, physio- and neurological research, at least to a basic degree. However, the exchange between family sociology and psychology remains limited. The economic approach to the family of the “Chicago School” is well known (*Becker 1981*), especially concepts such as opportunity costs (*Mincer 1963*) and bargaining models (*Muthoo 1999*). While the value of children approach (VOC) (*Nauck 2014*) is one example of connectivity between cultural and economic approaches, recent economic analyses of the family are often disparate. This is illustrated by the low degree of cross-citations between family demography, family economy, and family psychology. Beyond the mentioned disciplines, educational science, political science, and public health are also relevant for analysing families. Facilitating the integration of these diverse perspectives and countering fragmentation is one goal of FReDA. FReDA follows a multidisciplinary framework and includes sets of items from different disciplines, allowing for analyses of sociological, economic, psychological, and public health variables within one panel. Thereby, FReDA aims to contribute to a more integrative family science (*Fasang et al. 2016*).

The description of further key features of FReDA related to its content and survey design is the focus of the two following sections.

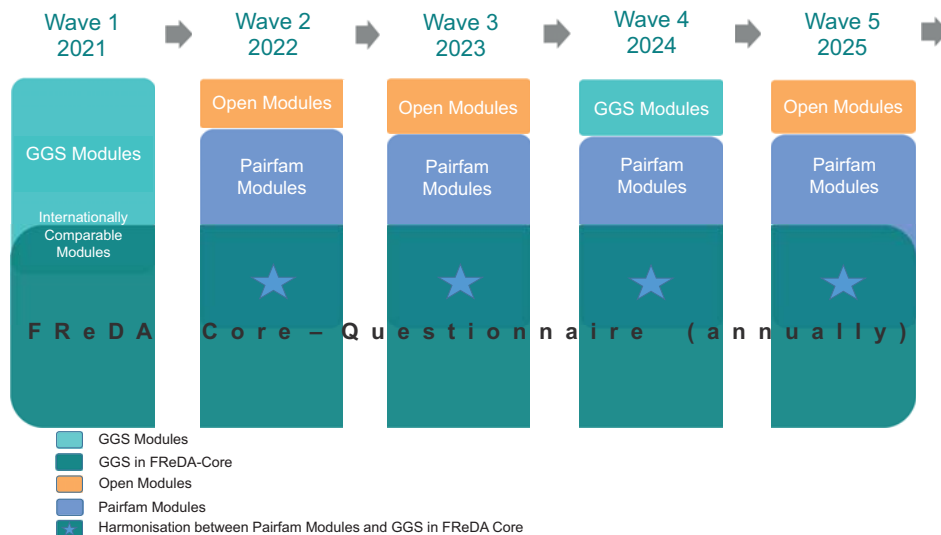
3 Questionnaire and core research fields

3.1 Overview and comparability over several waves

The guiding principle of the FReDA questionnaire – which follows a modularised design – is a mix of well-established scales, new items, and a permanently anchored process for innovation. For the initial panel wave (W1), the FReDA-GGS questionnaire is based on the German translation of the large-scale renewed international GGS questionnaire (*Gauthier et al. 2020*), thus taking advantage of the readjustment of the GGS – a promising strategy since several European countries are planning to start a new data collection with a new sample and the renewed questionnaire around 2021. Whereas most other countries participating in the GGS follow a three-year interval panel design, FReDA uses more frequent data collection with annual waves consisting of bi-annual interviews. The annual panel waves consist of repeated modules (a “core questionnaire” based on GGS items, which are for a

significant proportion harmonised with pairfam items), additional modules chosen from pairfam, as well as “open modules” (Fig. 1).

Fig. 1: Content of the FReDA-GGS-questionnaire for the first five waves



Source: own figure

The questionnaires include questions that are repeated annually. This is important, since analyses with panel data are often based on event history analyses (*Blossfeld et al. 2019*) or fixed effect analyses (*Allison 2009*). In SOEP, NEPS, and pairfam, the annually repeated part amounts to more than half of the questionnaire. The core questionnaire, featuring items comparable with the international GGS, records annual changes regarding family, work, mobility, and partnership biography, as well as attitudes and psychological items. Several pairfam questions are identical to GGS questions in the core questionnaire, or at least comparable (see *Hiekel et al. 2015*, for an example). These intersections speak to the high comparability of GGS and pairfam. Similar items were carefully harmonised in order to achieve the best possible comparability (e.g. by translating the GGS to German) for their inclusion in FReDA's core questionnaire. Several existing pairfam modules were selected for follow-up waves of FReDA to deepen and expand the initial GGS questionnaire with psychological and sociological modules. Furthermore, to reflect new interests and innovative measurement approaches, FReDA will use open calls for questions from which so-called open modules will be created.

For the purpose of international comparability, some GGS items which are not part of the FReDA core questionnaire will be asked every three years. Moreover, due to the stability of some item batteries (such as the Big Five personality traits), a rotating design with constant intervals is used for these items.

The partner questionnaire contains comprehensive coverage of partners' sociodemographic factors, life course events, and attitudes. Therefore, those questions from the anchor questionnaire which are of interest for dyadic analyses and allow for systematic comparison are used.

3.2 Wave 1: FReDA-GGS

The GGS questionnaire (*Gauthier et al. 2020*) is a well-known instrument first developed in the early 2000s (*Vikat et al. 2007*) and conducted in 20 countries between 2004 and 2020. For these countries, the GGS provides representative data. It has more than 4,500 registered users worldwide (*Fokkema et al. 2016; Gauthier et al. 2018*). The GGP conducted a realignment as part of the process for being recognised as an EU emerging project by 2017; and the EC-funded project Evaluate, Plan, Initiate (GGP-EPI) aimed to prepare the GGP to be part of the EU-recognised permanent European-based research infrastructures, such as SHARE and European Social Survey (ESS). A crucial part of this alignment is a completely new start of data collection with a revised questionnaire and the introduction of new survey modes.

The basis of the technical alignment within GGP-EPI was a pilot conducted by GGP and BiB in Germany, Croatia, and Portugal in 2018 (*Emery et al. 2019*). It tested the questionnaire for both CAWI and face-to-face interviews, which guided the process of making the questionnaire suitable for both modes and provided information for possible cuts. In November 2018, the GGS questionnaire task force suggested extensive changes for renewing the questionnaire to the GGP consortium board, which were improved and subsequently implemented and tested. Thereby a considerable number of questions which showed high dropout rates in the GGP-EPI pilot (*Emery et al. 2019*), especially parts featuring the theory of planned behaviour and the network sections, were shortened. The strategy was to add new questions, in order to capture new developments in family research and demography, such as enhanced measures for migrants, fertility ideals, health, reproductive health, mobility, digitalisation, and attitudes towards gendered working hours (*Gauthier et al. 2020*). In addition, some routings and categories were improved.

The GGS is constructed for a repetition every three years in participating European (and several non-European) countries (*GGP 2020*). Therefore, the FReDA-GGS Waves 1, 4, 7, and so on are primarily based on the international GGS rounds of data collection. These questionnaires are complemented by a few questions relevant for the German context such as parental leave and rent. Additionally, Wave 1 includes questions on the COVID-19 pandemic. In the following, we introduce the sections of the GGS questionnaire in the context of current research.

Demography

The demography section of the questionnaire contains socio-demographic measures such as age, origin, education, employment, housing, mobility, and – to some extent – migration and partnership biographies. In Germany, the proportion of persons with a migration background has been increasing for decades: In 2019,

the share of population with migration background was 26 percent, with almost one half being foreigners (48 percent) and the other (52 percent) having German citizenship (*BiB* 2020). The shares are higher among the younger generations, which are covered in FReDA (*BiB* 2020). Family events and migration are interdependent in the life course (*Kulu/Milewski* 2007). Migrant fertility patterns are shaped by processes of adaptation, socialisation, and disruption (*Baykara-Krumme/Milewski* 2017), and there are compositional effects on fertility measures. There is an ever-increasing relevance of research on diversity and the adaptation of attitudes and behaviour of first and second migrant generations, but still a considerable lack of data on this topic. Besides measuring the country of birth for the anchor, partner, and parents, the renewed GGS also measures languages usually spoken and plans of moving to another country.

For representative studies, adequate coverage of people with migration experiences is a special challenge that is difficult to meet. FReDA tries to meet this challenge in part by offering questionnaires in German and three other languages (see Section 4.1.).

Internal migration plays a key role for the distribution of the population. Europe currently shows patterns of urbanisation as well as de-concentration (*Rowe et al.* 2019). In the last decade in Germany, families have increasingly moved to lower-density localities (*Stawarz/Sander* 2019). Cohort fertility rates vary strongly within German counties (Verwaltungskreise), which is substantially associated with urbanisation and the availability of spacious dwellings (*Bujard/Scheller* 2017). The questionnaire measures housing, past mobility patterns, and future mobility plans. Furthermore, since digitalisation and media use – which are increasing during the Covid-19 pandemic – are relevant for families (*Coyne et al.* 2014), the questionnaire captures these items. The combination of measures on internal migration, socio-demography, housing, and media use with geo-referenced data is a promising option for future research and analyses.

Many life course decisions – such as starting a common household, marriage, having children and parenting – are made by couples. Others are at least often shaped within relationships, such as working hours or attitudes. The processes of communication and disagreement within couples are central for fertility decisions (*Brehm/Schneider* 2019; *Miller et al.* 2004). Partnership quality and stability are shaped by skills and traits, situational factors, as well as communication styles (*Sillars et al.* 2004). The combination of trivial daily events and interpersonal communication is decisive for the appraisal of stress in divorce (*Bodenmann et al.* 2007). Life satisfaction and partnership satisfaction are strongly related between intimate partners. It is known that one partner's unemployment or stress in the workplace also influence the life satisfaction of the other partner (*Luhmann et al.* 2014). Therefore, the questionnaire captures comprehensive sociodemographic information about the current partner, but also factors such as partnership satisfaction, conflicts, agreement or disagreement on important topics, and patterns of communication.

Life history

Since the onset of the Second Demographic Transition (*Lesthaeghe* 2010), marriage has been declining and cohabitation and non-marital parenthood has been increasing in most European countries. Union formation, cohabitation, marriage, and childbearing are postponed, often to ages above 30 (*Sobotka/Berghammer* 2021). These family life histories are interrelated and also interact with other life domains such as education, work, and mobility. Continuing diversity despite converging megatrends characterise the change and the current situation of the family in Europe (*Schneider* 2015). Significant differences can be observed not only between but also within countries. Within Germany, especially between East and West, there are substantial differences which are not only rooted in different political systems during the division of Germany, but also have older historical causes (*Klüsener/Goldstein* 2016). Due to different degrees of religiosity, social structures, and quite diverse degrees of urbanisation and industrialisation, family patterns were and still are different. Family forms have become increasingly complex since the 1960s, with a growing proportion of one-parent families, patchwork families, and stepparents (*Steinbach et al.* 2016). Voluntary childlessness within or without marriage is widely accepted and established throughout Europe. Social change in the context of individualisation and new partner market opportunities increase the chance of having a higher frequency of relationships within the life course and increases the probability of separation (*Rapp et al.* 2015). As one consequence of this dynamic, the post-separation family has become more and more important. Especially in case of parenthood, divorce does not mean the end of the family, but rather the transformation into a post-divorce family. Little is known about family relationships after separation. For example, knowledge about the father-child relationship and its impact on the well-being of all family members in the years following separation is limited. Previous studies have, however, shed light on the role of joint custody (*Köppen et al.* 2018).

The complexity of family dynamics poses challenges for measuring the diversity of family forms and of fertility. Biological children, adopted children, and children from previous partners of both anchor and partner must be measured precisely in order to generate reliable data on family forms and social parenthood.

Fertility

For decades, low and lowest-low fertility – with period total fertility rates (PTFR) below 1.5 – has been a phenomenon of several highly-developed countries in Europe (*Kohler et al.* 2002), as well as some East Asian countries. Persistently low fertility results in population aging and decline, both of which have severe consequences for pensions, health systems, the economy, labour markets, party systems, and society (*Bujard* 2015). The fertility section is the most frequently analysed section in the GGS. Plenty of research has used the Theory of Planned Behaviour (*Ajzen* 1991) to analyse child intentions, using the combination of behavioural, normative, and control beliefs (*Ajzen/Klobas* 2013) and focussing on a specific timespan (three

years in the GGS) for “intentions in competing domains” (Vikat et al. 2007). Fertility intentions, and the failure to realise them, have been analysed in the context of family policies (Billingsley/Ferrarini 2014), post-communist fertility transitions (Spéder/Kapitány 2014), residential mobility (Vidal et al. 2017), and persistent joblessness (Busetta et al. 2019). The GGS questionnaire covers fertility intentions in the next three years, necessary conditions, and anticipated effects on various aspects of life. The GGS measure of period and cohort fertility is accurate for the younger and middle-aged cohorts (Vergauwen et al. 2015). The questionnaire captures the life history of previous partners and of anchors’ and partners’ adopted and biological children.

There are different measures of “hypothetical fertility” such as intentions, norms, attitudes, and ideals (Philipov/Bernardi 2011). An overview of European surveys between 2005-2012 shows that around 60 percent of women aged 15-49 have an ideal family size of two children, reflecting a persistent two-child norm (Sobotka/Beaujouan 2014). Such norms limit the scope of economic approaches to fertility, because once a couple has fulfilled a two-child ideal, policies or income lose relevance. However, a two-child norm does not result in PTFR of 2.0, since in modern societies the share of permanent childlessness is often around 15 or 20 percent (Kreyenfeld/Konietzka 2017). In Germany, decomposition analyses show that the decline of large families (parity 3 or more) has a higher impact on the decrease of the cohort total fertility rates than increasing childlessness does (Bujard/Sulak 2016). Therefore, understanding changes of fertility ideals is decisive. Fertility ideals change over ages and cohorts (Testa 2012), and highly-educated women have higher life-time fertility intentions (Testa 2014), resulting in a wider fertility gap for this group. The questionnaire asks for the personal and general ideal number of children, and captures the norms of a specific family size as perceived in society and the personal ideal.

Fertility behaviour and outcomes cannot simply be analysed by referring to ideals or planned behaviour; they rather depend on the physiological and medical ability to have children. Medical infertility increases with age, especially for women; however, lifetime prevalence is rarely measured. In contrast, the self-perception of infertility, or more precisely of the inability to procreate, can be measured over the life course; it turns out to be a temporal phenomenon which is shaped by health, the life course itself, and socio-structural factors (Passet-Wittig et al. 2020). Increasingly, the use of medically assisted reproduction (MAR) is a relevant factor for fertility behaviour and outcomes (Geyter et al. 2018). Estimations show that MAR has had the potential to almost neutralise the postponement effect on the increase of involuntary childlessness in recent decades (te Velde et al. 2012). Infertility, its perception, and infertility treatment often are associated with distress (Greil et al. 2011). The questionnaire covers information on reproductive health, MAR, sexual intercourse, contraception, and infertility perceptions for both anchor and partner.

Division of housework

It is well known that the previously equal division of housework often becomes unequal during the course of a relationship, especially after the birth of children or after marriage (*Nitsche/Grunow* 2016). Inequalities in the division of household work are associated with perceptions of unfairness, especially in countries with gender equity institutions (*Greenstein* 2009). The division of household chores follows a couple's bargaining process, whereby attitudes and resources such as different earnings potentials are crucial (*Esping-Andersen/Schmitt* 2020). The questionnaire records the division of several different tasks in the household and of childcare, an appraisal of fairness, and the decision-making process.

Some households outsource housework to cleaning services. Childcare is also often provided outside the household, especially through public care infrastructure and social networks. Institutional childcare and the expectation of informal care from grandparents can positively influence the transition to having a first child (*Hank et al.* 2004). Against this background, the questionnaire measures the use of various childcare services and patterns of help within the network and kin.

Generations and well-being

Research suggests that adult intergenerational relationship quality is an important contributor to quality of life and enhanced well-being, as well as a precursor to the exchange of support and care. Conversely, having distant or fractious relationships is associated with deleterious outcomes, such as greater depression, lower life satisfaction, increased health difficulties, and earlier mortality (for a review, see *Steinbach/Hank* 2016). Fully understanding the complexities of intergenerational relations requires theory regarding the dimensions that connect individuals across generations. The solidarity-conflict paradigm proposed by *Bengtson* and colleagues (*Bengtson et al.* 2002) provides a useful conceptual scheme for mapping the emotions, behaviours, and norms that characterise these relationships. The questionnaire covers several core dimensions of this model, namely geographic proximity and frequency of contact (reflecting the opportunity structure for intergenerational interaction; *Hank* 2007), as well as the quality of respondents' relationships with their parents (see *Hank et al.* 2017 for an example using pairfam). Instruments capturing further dimensions of the model were shifted to the second GGS wave scheduled for 2024 (that is, FReDA's Wave 4).

Work and Income

In the life course of young and middle-aged adults, work biographies and family trajectories are more or less intertwined with each other at the individual level as well as between partners (*Aisenbrey/Fasang* 2017). The division of gainful employment and family work between men and women still features severe differences and reflects societal gender roles and task-sharing in the relationship. However, there are considerable differences among women regarding their preferences and needs

concerning employment, family work, and responsibilities in family care (*Hakim* 2003). Social norms and expectations influence these preferences and the related behavioural patterns. European countries have been experiencing a decades-long, sustained increase of female labour market participation. This development is associated with shifts in gender equality and family-oriented policies aiming to reconcile work and family; however, these changes remain ongoing (*Esping-Andersen* 2009). Beyond progress in reconciliation policies, work-family and family-work conflicts impair professional careers for many women. Employment patterns are frequently “uneven and stalled” (*Damaske/Frech* 2016), as is the case for an increasing number of men in several western countries as well.

In many countries in Europe and around the world, short-term and irregular work arrangements are increasing, including fixed-term contracts, temporary agency work, or part-time work. Working irregularly is known as a risk factor for stress and life satisfaction; temporary work is often associated with a lower direct job satisfaction and lower life satisfaction due to poorer working conditions (*Aleksynska* 2018). The social stratification for irregular work is well-known, including by gender, age, education, and ethnic background (*Damaske/Frech* 2016). In the work-family context, job-related mobility has far-reaching consequences for family-related decisions, quality of life, and health (*Rüger et al.* 2017). Voluntariness and designability are most important factors for health and subjective well-being, and therefore also are important in family life and family development. The questionnaire covers information on occupation biographies, working hours, irregular work, commuting time, subjective stress measures concerning work, and other important risk factors of well-being.

Even in many European welfare states, up to one sixth of inhabitants are at-risk of poverty and in most countries, child poverty exceeds the overall proportion (*Atkinson/Marlier* 2010). Social inequality and income poverty can be associated with disadvantages in health, social participation, societal inclusion, education, well-being, and housing (*Bradshaw/Nieuwenhuis* 2021). Higher levels of inequality are associated with lower life satisfaction not only for poor, but also for middle class families, especially when they have economic worries (*Roth et al.* 2017). For family life, child well-being and family-related decisions, earnings, and income including welfare state benefits are important factors. Therefore, the questionnaire covers different kinds of household income, the subjective appraisal of affordable goods, and future expectations.

Attitudes

Family development and family-related decision-making are not only influenced by structural or economic factors – norms and attitudes are also of importance. Attitudes often evolve during the life-long socialisation process, and can be changed by life course trajectories, such as the transition to parenthood. Past research has shown that attitudes towards motherhood and fatherhood can be affected by this transition (*Buchler et al.* 2017). However, it remains unclear whether attitudes influence the timing and probability of transitions and in which way transitions

influence attitudes. Plenty of research has established that gender role attitudes influence behaviour (*Katz-Wise et al.* 2010), such as attitudes for fertility (*Arpino et al.* 2015). Individual attitudes can also be aggregated and used to measure broader norms, as shown by *Panova and Buber-Ennser* (2016) for the pervasiveness of traditional views regarding parental employment for 14 countries with GGS data. However, discrepancies between attitudes towards gender roles and real behaviour can often be observed. Because gender roles are changing and gender equality is increasingly accepted, social desirability is turning more and more important for the division of labour in the family. Even in families in which at least one partner has traditional attitudes towards gender roles, non-traditional patterns of the division of labour can occur. Therefore, the questionnaire covers broad attitudes regarding gender equality, as well as practical implementation, such as gendered beliefs towards ideal working hours. Furthermore, attitudes towards fertility, parenting, and religiosity are asked. One goal is to get more information about the complex interplay of structural factors, the economic situation, cultural norms on family development, and especially on the transition to parenthood.

COVID-19 pandemic

The COVID-19 pandemic has challenged many survey research projects, including pairfam and FReDA-GGS (see *Gummer et al.* 2020), which had to adjust fieldwork procedures with respect to the changing situation. At the same time, COVID-19 triggered a plethora of new data collection efforts, only some of which built upon ongoing studies with near real-time information on how the virus changed family life (see, for example, the study by *Hank and Steinbach* (2021) based on the pairfam-COVID-19 survey, described in *Walper et al.* 2020). Consequently, the FReDA-GGS baseline questionnaire includes questions on COVID-19-specific concerns regarding health, the financial situation, contact to other persons, and the appraisal of COVID-19 policies. FReDA is therefore well-positioned to provide insights on the medium- and long-term consequences of the pandemic on family life, family development, fertility, and family well-being. In addition, more generally, FReDA's panel design with bi-annual interviews allows for the analysis of such exogenous shocks' and policies' effects on work, partnerships, families, and health, because these spheres are continuously covered in the questionnaire (see above).

3.3 Waves 2 and 3: FReDA-GGS core and psychological items derived from pairfam

The survey instruments of Waves 2, 3, 5 and 6 consist of core modules that allow for change measurements and are therefore repeated annually. Additionally, user-driven open modules are included, as are modules taken from the current pairfam survey instruments that primarily address psychological topics: (1) partner relationship quality, (2) personality and self-concept, and (3) subjective well-being. This is intended to better examine the interplay between individual psychological

characteristics and family development processes, living arrangements, and social and emotional well-being (Gerstorf et al. 2013; Neyer/Asendorpf 2018). For example, life forms such as living in a partnership or as a single person can be seen as an expression of the fit between personality and relationship (Hagemeyer et al. 2015).

Partner Relationship Quality

Partner relationships are among the closest and most important relationships individuals can have in contemporary societies (Neyer et al. 2011). The quality of partner relationships is a major predictor of relationship satisfaction and stability (Proulx et al. 2017). Based upon the assumption that good relationships are made of at least two persons, Finn et al. (2020) showed that co-development between individual views and evaluations of partner relationships is a safe baseline for satisfied and long-lasting units (see also Huston et al. 2001; Schoebi et al. 2012). Therefore, pairfam gathered a theoretically-informed set of indicators of relationship functioning that will be included in the FReDA panel study and which will be studied from the dyadic perspective of both partners. These are the fulfilment of social needs (feelings of connectedness and intimacy), relationship satisfaction, commitment, and conflict, providing a robust set of time-varying aspects of relationship functioning.

Personality

Personality is defined as a relatively stable set of characteristics concerning the typical way an individual person thinks, feels, and behaves across a wide variety of situations, including social relationships. In pairfam and FReDA, we focus on the Big Five taxonomy (comprising the personality traits of neuroticism, extraversion, openness, agreeableness, and conscientiousness) as one of the most prominent trait models (Malouff et al. 2010). In addition, we study self-esteem as the central evaluative component of the self-concept, which is highly sensitive to relationship experiences (Luciano/Orth 2017). We assume that partners and family members need to negotiate how they can enact their personalities, pursue their goals, and fulfil their needs within relationships via personality-relationship transactions (Neyer/Lehnart 2007). These transactional processes unfold over time and between both couple members, which is why it is crucial to assess them repeatedly in anchor and partner participants. For example, it has been shown that individual personality traits influence the relationship satisfaction of both partners (Robins et al. 2000), and personality may change in response to relationship experiences (Finn et al. 2015).

Well-being

Individual and relational well-being are generally viewed as important outcomes of relationship and family life (Karney/Bradbury 1995; Reis et al. 2000). However, it is quite often overlooked that well-being may also in turn affect relationship and individual psychological functioning (Neyer/Asendorpf 2018). We therefore aim at

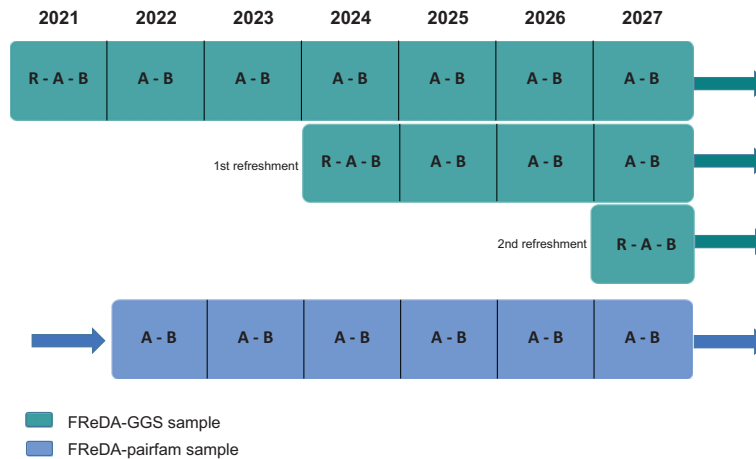
assessing various aspects of well-being continuously in pairfam and FReDA. Among other factors, we focus on the loneliness that occurs when individuals perceive qualitative and quantitative features of their relationships as deficient (*Mund et al.* 2020). Because loneliness is an important predictor of health problems, it is also important to study depressiveness as a central indicator of negative affect. Both chronic loneliness and depressiveness represent crucial threats to life satisfaction, and conversely not feeling lonely and not experiencing negative affect are among the central pillars of a happy life.

4 Survey design

FReDA is *one survey* consisting of *two samples*: The new FReDA-GGS sample and the continued FReDA-pairfam sample. It is designed as a panel survey with bi-annual interviews conducted via self-administered mixed modes (online and postal) of the German general population between 18 and 49 years of age (and the four particular cohorts represented in the pairfam sample, see Section 4.2). The FReDA-GGS sample starts in 2021 and will be refreshed every three years; the pairfam sample will be continued as “FReDA-pairfam” from 2022 onwards, following 14 waves from 2008-2022 (see Fig. 2). We aim to interview anchor persons as well as their partners (if applicable). The general design principles of FReDA aim to ensure high panel stability, data quality, cost efficiency, and inclusion of the offline population. Regarding the latter, we acknowledge that a significant part of the population either has no access to the internet or does prefer not to participate in surveys such as FReDA via the web. Based on extensive experimentation in the European Values Study (EVS) 2017 in Germany, *Wolf et al.* (2021) report that, if given the choice during the first contact, roughly 80 percent of respondents decided to participate via a paper-based, mailed questionnaire. In this study, even when nudging respondents towards online participation by only providing a paper-based questionnaire with the third contact, a significant share of participation via analogue mail remained – even for the younger cohorts. Similar findings in favour of providing an additional mail-in option were reported for other European countries that participated in the EVS experiments (*Luijckx et al.* 2021). To not exclude these cases by design and, thus, risk a coverage bias by omitting the offline population and those preferring the physical questionnaire (e.g., *Blom et al.* 2017; *Cornesse/Schaurer* 2021), the project team decided to use a mixed-mode design. By offering mixed modes we further aim at improving the survey experience by allowing respondents to participate in their preferred mode. Previous research has shown that a positive survey experience increases the respondents’ likelihood of participating in subsequent panel waves (*Gummer/Daikeler* 2020; *Struminskaya* 2014, Chapter 4).

4.1 FReDA-GGS: The new sample

The recruitment of FReDA-GGS will start in 2021 with a questionnaire specifically designed for recruitment purposes (W1R). In two subsequent waves in 2021

Fig. 2: FReDA: Planned design from 2021 to 2027

Note: Regular waves are bi-annual (A and B), whereas new samples are recruited via an additional short recruitment interview (R).

Source: own figure

(W1A and W1B), the GGS instrument will be administered to respondents who were successfully recruited. Every three years when the GGS questionnaire is re-implemented, a refreshment sample will be drawn. Refreshing the panel serves two purposes. First, refreshments are intended to replace the respondents who have dropped out of the panel. Even though other academic German mixed-mode panels reported promising retention rates (*Blom et al. 2015; Bosnjak et al. 2018*), a panel will always lose respondents over time, lowering the statistical power of the data. Second, refreshing the panel serves the purpose of adding respondents from younger cohorts who were not eligible in prior sampling. The planned refreshments will thus enable researchers to use FReDA not only for analysing individual change, but also for investigating social change (*Firebaugh 2018; Gummer 2015*).

Sampling

For the recruitment of FReDA, a probability-based sample of 100.000 respondents was drawn from German municipalities' population registers. We refer to this sample as the FReDA-GGS sample. Based on prior experiences with self-administered surveys in Germany, we expect a response rate to W1R of around 30 percent. With respect to participation in subsequent panel waves, we assume the retention rates to converge to approximately 90 percent, similar to what GIP and the GESIS Panel reported (*Blom et al. 2016*).

The sampling approach of FReDA was initially designed for a face-to-face survey with 320 sampling points, however, when the COVID-19 pandemic struck, changes were made to the FReDA design (see below) and more addresses were drawn

from the selected municipalities to facilitate a large-scale mixed-mode survey. For the gross sample, individuals aged between 18 and 49 years and registered in the selected municipalities were selected. The sampling approach was designed to generate a self-weighting sample; thus, all gross sample cases had the same inclusion probability. We plan to use the same sampling procedure for future refreshment samples to ensure comparability between samples.

Design of W1R, W1A, and W1B

Three surveys are planned for FReDA in 2021. In April, the FReDA-GGS sample will be administered the questionnaire of W1R, i.e. the recruitment wave. Here, respondents will be provided with a ten-minute questionnaire that collects basic information from the respondent and, most importantly, their panel consent (i.e., their consent to be re-interviewed in subsequent panel waves). The remainder of this short questionnaire features selected questions from FReDA deemed especially interesting for the general population. The aim of W1R is to achieve a high participation rate and willingness to participate in the panel itself. Thus, in line with previous research on survey experience and panel attrition (e.g., *Gummer/Daikeler 2020; Struminskaya 2014*), the questionnaire is designed to be short and interesting.

Respondents are contacted up to three times by mail and invited to complete in a web-based (link and password are provided) or a paper-based questionnaire (stamped return envelopes are provided). While providing paper-based questionnaires to include the offline population and improve the survey experience, we nonetheless aim for a high share of participations via web-based questionnaires. In the web mode, responsive questionnaire design is used to facilitate the use of mobile devices.

Respondents who provided their consent to be contacted again during W1R are then invited for two additional surveys in 2021 (W1A, W1B). Fieldwork for W1A is scheduled to start in July, W1B in October. The questionnaires of both surveys consist of the German-language version of the international GGS questionnaire that was split into two parts by the project team. The projected survey length is 25 minutes per survey. Contacts, mode choice, and incentives are planned to be similar to W1R. As before, this approach was selected to ensure that respondents are not burdened with an overly lengthy survey, thus facilitating a positive and motivating survey experience.

In addition to the German language versions of W1R, W1A and W1B, additional versions for the web-based questionnaire will be provided in Arabic, Turkish, and Russian. The goal behind these additional efforts is to allow respondents with limited German skills to participate in the survey and thus mitigate a possible migration bias in the panel.

Design of W2A, W2B, and subsequent waves

Starting in 2022, FReDA will conduct bi-annual interviews among its active participants. Active panellists include respondents who have completed W1R,

consented to take part in re-interviews, and have not missed more than two consecutive interviews. Those respondents who do not take part in two consecutive interviews (e.g., W2A and W2B) will no longer be considered active in the FReDA panel and thus will not receive further invitations to participate (i.e., they will drop out of the panel). In addition, panellists will only be surveyed up to the age of 55. Whether and how these persons might continue to be surveyed is to be decided.

The design of subsequent waves will be similar to the design of W1R, W1A, and W1B. We aim for an average length of 20-25 minutes per survey. Respondents will be able to participate by completing web-based and paper-based questionnaires. They will be invited to participate in a wave up to three times by mail. Once again, responsive questionnaire design will be used to facilitate the use of mobile devices when answering the FReDA questionnaire.

Incentives

With the first contact of each wave, each respondent will receive a 5€ unconditional incentive. The pre-paid incentive is included in the invitation letter sent to all respondents. This incentive strategy is used in W1R and the subsequent waves (W1A, W1B, W2A, etc.). In addition to the unconditional incentive, additional funds have been reserved to specifically incentivise respondents with lower likelihoods of participating in later waves of FReDA. Starting W1B, based on their participation in W1R and W1A, respondents with a high likelihood of dropping out of the panel will be identified and will receive additional incentives. This strategy aims at increasing the participation among respondents with high attrition probability and thus to reduce attrition bias.

Partner interviews

FReDA is not limited to collecting information on the anchors, but also on their partners. Therefore, beginning with W1A, those respondents who are currently in a relationship will be asked to provide contact information for their partners. These partners are then also invited to participate in FReDA surveys. Partners receive questionnaires which are based on the anchor questionnaire, but are adapted and reduced to an approximate length of 20 minutes. Nonetheless, the design of the partner survey is similar to the anchor survey. Partners are invited up to three times by mail to participate in the self-administered mixed-mode surveys (web- and paper-based questionnaires) and receive a 5€ unconditional incentive with each first contact. The first partner survey is conducted in parallel to W1A. Starting in 2022, each regular wave of FReDA will also feature a partner survey.

Necessary adjustments due to COVID-19

FReDA was initially planned to be fielded in 2020 with a recruitment survey that featured the full-length 60-minute GGS questionnaire. The intention was to conduct the recruitment interview in-person. This approach aimed at a high recruitment rate

for the following panel waves and the inclusion of the offline population in FReDA. However, when the COVID-19 pandemic broke out in early 2020, the project team decided to halt preparations for data collection and postpone the field start. Since we expected that collecting high quality data by face-to-face interviews in 2021 would also be impaired by the COVID-19 situation, data collection was switched to self-administered systems utilizing web- and paper-based questionnaires. A detailed account of an early part of this process and the reasoning behind the decisions is given by *Gummer et al.* (2020). Similar discussions emerged in other renowned large-scale survey projects in Germany and other countries (*Burton et al.* 2020; *Sakshaug et al.* 2020; *Sastry et al.* 2020; *Scherpenzeel et al.* 2020).

The changes in the survey design were made to ensure that FReDA data collection could start in early 2021 and is affected as little as possible by COVID-19 developments. Guiding principles of the design changes were to replace the face-to-face mode by self-administered modes in a way that ensures the inclusion of the offline population, the achievement of high panel consent rates, as well as high data quality.

By changing the design and fully committing to a more cost-efficient self-administered design, additional resources became available. These resources are used to mitigate important challenges panel surveys in Germany are likely to face, namely a misrepresentation of migrants and selective attrition. The respective design decisions are described above.

4.2 FReDA-pairfam: Continuing the 2008 panel with FReDA from 2022

The FReDA-pairfam sample originates from the DFG-funded long-term project "Panel Analysis of Intimate Relationships and Family Dynamics" (*Huinink et al.* 2011). pairfam is an annual and currently 14-wave multi-actor panel study in Germany covering a wide range of family-related topics. Since 2008, pairfam has collected data from a probability-based sample (N=12,000) of the birth cohorts 1991-93, 1981-83, and 1971-73. With Wave 4, the related study DemoDiff, with its East German supplemental sample, was integrated into pairfam (*Kreyenfeld et al.* 2012). A new cohort (born 2001-03) and a sample refreshment for the two younger initial cohorts were added in Wave 11 (*Brüderl et al.* 2020).

Data are collected in annual waves as computer-assisted personal interviews (CAPI). The COVID-19 pandemic necessitated a mode switch to computer-assisted telephone interviewing (CATI) during the fieldwork for Wave 12 (*Gummer et al.* 2020), which was supplemented by a web survey to collect information on family life during the COVID-19 crisis (*Walper et al.* 2020). Wave 13 allowed for both face-to-face and telephone interviewing to react flexibly to the highly dynamic situation during the pandemic. In regular waves, sensitive questions were administered on-site as computer-assisted self-interviews (CASI) to ensure respondents' privacy. In addition to the primary respondents ("anchors"), anchors' partners and children aged 8 to 15 years are surveyed as well. Partners receive a paper-based self-administered questionnaire (PAPI), whereas children are interviewed via CAPI

in the primary respondent's home. Moreover, in Waves 2 through 8, the anchor respondent's parents were also interviewed in PAPI mode.

Integration of the pairfam sample into FReDA

The integration of the pairfam sample and content into FReDA (as "FReDA-pairfam" from Wave 15 onwards) requires several substantial changes to previous procedures and will thus already start with the final DFG-funded Wave 14, which will be collected in autumn 2021:

(a) Changes in survey mode:

- From Wave 14, both anchor respondents and their partners can opt to be interviewed online (CAWI) or with a paper-based questionnaire, instead of the previous procedure of CAPI for anchors and PAPI for secondary respondents.
- Due to the mode change, the duration of the interview (and thus the questionnaire programme) must be shortened substantially: Wave 14 interviews are designed to take about 20-25 minutes (rather than currently one 60-minute interview).
- Note that pairfam includes a mode experiment in Wave 14 to test whether there are differences in answers when data are collected online, by PAPI, or CAPI. For this purpose, face-to-face interviews of a random subsample of 1,000 respondents will be conducted, as in the previous waves. These CAPI interviews will be identical to the online survey fielded for the main sample.

(b) Changes in the multi-actor design:

- In addition to anchor respondents, only partners will be surveyed (as in FReDA-GGS). That is, pairfam will abandon the child interview in Wave 14, as targeting young children in a mixed-mode survey has proven to be difficult (*Jäckle et al.* 2015).
- Moreover, as the focus of FReDA will mainly be partnership- and fertility-related issues, pairfam's extensive parenting questionnaires will be shortened. Related content that is relevant for FReDA will be shifted to the main anchor and partner surveys in Wave 14.

The guiding principle for the integration of pairfam into FReDA is the harmonisation of the questionnaire for both samples, FReDA-GGS and FReDA-pairfam. The pairfam questionnaire was shortened and adapted to the above-mentioned mode change after Wave 12. Since pairfam and GGS have similar research topics, there is a considerable overlap between both questionnaires. For the translation of the GGS questionnaire, the goal was to harmonise questions with pairfam if possible, in order to strengthen the comparability of German data and to continue pairfam under the roof of FReDA.

Despite the described modifications, main features of pairfam will remain unchanged by the transition to FReDA:

- The questionnaire programme of pairfam, as far as it is relevant with regard to FReDA's family-demographic focus, will be continued (in a harmonised form where necessary), and supplements FReDA's core questionnaire modules.

- The data structure (including respondent identifiers and variable names) will remain unchanged to ease merging information from FReDA-pairfam with prior waves of pairfam to be used as a long-term panel data set.
- Quality measures, data management, and documentation will continue at their high standard and the data will continue to be distributed via the GESIS Data Archive.

Importantly, to facilitate knowledge transfer and enable a smooth, gradual transition from pairfam to FReDA-pairfam, Christof Wolf joined the pairfam council in 2020, linking the pairfam and FReDA project teams even more closely and contributing GESIS' survey methodological expertise.

5 Data accessibility and organisational structure

Data accessibility

A major goal of FReDA is to create a data infrastructure for the broadest possible scientific use. Data from all waves are quickly processed and entered into the GESIS data archive. Users will be able to search for data via search engines and access metadata. The guiding principles in our data publication strategy are timely releases, transparency, and user-friendly documentation. FReDA aims for annual data releases. These releases will include the new data and updated documentation. Datasets will be made available both for anchors and partners with identification variables that enable examining the dyadic structure of the data. Each data release is issued a persistent identifier (DOI) to ensure that FReDA data are findable and can be properly cited in publications. The use of DOIs allows researchers to search for the exact version of FReDA data that was used in a publication and replicate published findings. To ensure replication, the GESIS data archive will provide access to all data releases of FReDA, not just the newest.

To ease the use of FReDA data for substantive analyses, we aim at providing extensive documentation with each release. This documentation will include each wave's questionnaire as well as detailed reports on the data collection efforts. The documentation of data collection will not only cover information on the methodology (sampling, modes, contact strategy) and outcome metrics such as response, retention, and drop-out rates, but also data quality indicators. With these additional indicators, we aim to equip researchers with the necessary tools to evaluate whether the data contain biases that might affect their analyses.

FReDA data releases will include additional variables that convey information regarding data collection (e.g., dates of fieldwork period, wave, mode) as well as weights – if required – to correct for quality issues (e.g., to correct for nonresponse or selectivity). These variables will be described in the supplemental documentation along with practical recommendations on how to use these weights. Data will further be geo-referenced to enable linking with geospatial and contextual data.

We aim to provide data access with as few barriers as possible. Accordingly, FReDA data will be made available as a scientific use file in which sensitive data are

aggregated. Additional data sets with sensitive and more fine-grained data will be accessible in the Secure Data Centre at GESIS. Here, users will be able to draw on the geo-referenced data and link contextual data with FReDA data.

Overall, the data publication strategy of FReDA meets the principles of FAIR data in that they are findable, accessible, interoperable, and re-usable (*European Commission* 2016). In addition to the FReDA data hosted at GESIS, the FReDA project will deliver the German GGS data (from Waves 1, 4, etc.) to NIDI for inclusion in the international GGS data set.

Organisational structure

FReDA is a consortium consisting of the Federal Institute for Population Research (BiB), GESIS – Leibniz Institute for the Social Sciences, and the pairfam consortium (represented by the Universities of Cologne and Jena). Each of these three entities has two representatives in the board of project partners, that is, FReDA has six principal investigators (PIs). The founding PIs are the initiators of the proposal, namely Norbert F. Schneider (BiB), Martin Bujard (BiB), Christof Wolf (GESIS), Tobias Gummer (GESIS), Karsten Hank (University of Cologne) and Franz J. Neyer (Friedrich Schiller University Jena). The consortium was legally established by an agreement in 2020 (the idea for FReDA was originally born in 2015), and is coordinated at the BiB. For the setup and consolidation phase, FReDA is funded by the Federal Ministry of Education and Research (BMBF) from 2020-2024. In the case of a successful interim evaluation, the Federal Ministry of the Interior, Building and Community (BMI) intends to fund FReDA permanently through the BiB's budget from 2025 onwards.

FReDA aims to provide a multidisciplinary scientific community with innovative, cross-nationally comparable panel data on family and demography in Germany. In addition, FReDA aims to produce data that enable scientific analysis for policy advice. The composition of the FReDA Council reflects these intentions. The FReDA Council consists of six scientists from different disciplines (survey methodology, demography, sociology, psychology, and economics). Further members represent federal ministries; the Federal Ministry of Education and Research (BMBF), the German Federal Ministry of the Interior, Building and Community (BMI), the Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth (BMFSFJ), the Federal Ministry of Labour and Social Affairs (BMAS), and the Federal Ministry of Finance (BMF), who have a status as permanent guests and observers on the FReDA Council.

Furthermore, the BiB ensures the international comparability of FReDA by itself being a permanent member of the GGP consortium board, a member of the questionnaire task force, and by participating as a node on the operational level of GGP together with the coordinator, the Netherlands Interdisciplinary Demographic Institute (NIDI), and the French National Institute for Demographic Studies (INED).

Exchange with the scientific community as well as with policymakers and civil society is crucial for FReDA. Therefore, an outreach team is part of the project and tasked with developing a communication strategy and ensuring knowledge transfer. The FReDA communication strategy features user conferences, user support, a

website (www.freda-panel.de), a newsletter, social media efforts, and continuous exchange with stakeholders. To cover the demands of policymakers, annual policy briefs and policy workshops are planned. To serve emerging needs of the scientific community, a call for open modules inviting new items for the FReDA questionnaire programme is open throughout the entire project.

6 Conclusion and outlook

FReDA – The German Family Demography Panel Study, aims to produce innovative data for family research as a collective good for the scientific community and for policy and society more generally. The core elements of FReDA are (1) representative data for the target population, (2) annual panels with bi-annual surveys, (3) a consistent multi-actor design, (4) international comparability, (5) the theory-based construction of survey instruments, (6) regional data enrichment, (7) multidisciplinary, (8) the combination of well-established and new items in a modularised design of the questionnaire, and (9) permanent innovation through user-driven open modules.

As the central data infrastructure for family demographic research in Germany, FReDA makes five primary contributions.

(1) FReDA contributes to the further development of theoretical perspectives and their empirical implementation. The questionnaire construction strongly follows the life course paradigm. In order to analyse family development in the interdependent spheres of life and under the respective intra- and extra-individual behavioural conditions, the survey instruments make use of core elements of decision-making and bargaining approaches. Beyond GGS, which is essentially based on the theory of planned behaviour, FReDA aims not only to study the effect of attitudes on action, but also to make visible the emergence and change of these attitudes over the life course. FReDA continues the successful pairfam project, strengthens GGP, and goes beyond GGS by offering additional content and consistently applying the life course perspective. This is the case because annual panel waves allow for progression pattern analyses and event-analytical methods, enabling the identification of cause-effect relationships (e.g., after events in the individual life course or after political reforms).

(2) FReDA contributes to the advancement of survey methods. In particular, further experience with fielding large-scale population surveys in self-administered modes will be gained. Given the current nonresponse and survey cost challenges these surveys are facing (see, e.g., *Wolf et al.* 2021), more insights on the matter are needed. FReDA will also provide evidence on the recruitment of a panel survey already using self-administered modes in the recruitment interview itself. We further expect that FReDA will help to advance methodological research on mixed-mode surveys and especially on web survey methodology. Furthermore, FReDA has several design features, made possible by the design changes in response to the challenges imposed by the COVID-19 pandemic. These features include, for example, an adaptive survey design to increase participation among likely panel drop-outs with targeted incentives, as well as by providing questionnaires in multiple

languages to mitigate the misrepresentation of migrants. We expect these design features of FReDA to provide further opportunities to advance methodological knowledge.

(3) By consistently implementing partner interviews, new insights into the importance of dyadic decision-making processes is expected to be gained, as will experience regarding their improved empirical recording.

(4) By continuing FReDA-pairfam, it will be possible to map long periods of the family development process – from its beginning to its later phases – based on differentiated data.

(5) The international comparability of much of the data obtained in FReDA will considerably improve the possibilities for international comparative family research. The international comparative perspective in relation to other European countries will enable the analysis of peculiarities of the demographic situation in Germany depending on context-specific social, political, and economic factors.

We sincerely hope that FReDA will provide a solid data basis for the improvement of theories and methods, and for cutting-edge empirical research on family and social demography.

Acknowledgements

Funding of FReDA by the German Federal Ministry of Education and Research (BMBF) under the grant numbers 01UW2001A, 01UW2001B, and 01UW2001C is gratefully acknowledged.

We would like to thank the Federal Ministry of the Interior, Building and Community (BMI) for making it possible in 2018 to finance the setup phase of the project by providing the prospect of institutionalised permanent funding for the project after a positive interim evaluation in 2024. We thank the reviewers for thoroughly reading this paper and providing useful comments.

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Date of submission: 12.02.2021

Date of acceptance: 09.04.2021

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Comparative Population Studies

www.comparativepopulationstudies.de

ISSN: 1869-8980 (Print) – 1869-8999 (Internet)

Published by

Prof. Dr. Norbert F. Schneider

Federal Institute for Population Research
D-65180 Wiesbaden / Germany



Managing Editor

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